

CLAIMS

1. A self-aligning roller bearing in which double row rollers as rolling elements are arranged rollably between an inner ring and an outer ring in a circumferential direction,

wherein a roughness of an outer ring raceway surface formed on an inner peripheral surface of the outer ring is made larger than a roughness of an inner ring raceway surface formed on an outer peripheral surface of the inner ring, and

an average roughness R_a of the outer ring raceway surface is set within $0.1 \mu\text{m} \leq R_a \leq 0.5 \mu\text{m}$ in an axial direction and a circumferential direction, and a roughness parameter S that is defined by

$$S = \frac{1}{n} \sum_{i=1}^n S_i$$

where n is a number of peaks of the roughness of a roughness curve indicating the roughness of the outer ring raceway surface, and

S_i is an interval between neighboring peaks of the roughness curve

is set within $0 < S \leq 20 \mu\text{m}$.

2. A self-aligning roller bearing in which double row rollers as rolling elements are arranged rollably between an inner ring and an outer ring in a circumferential direction,

wherein a roughness of an outer ring raceway surface formed on an inner peripheral surface of the outer ring is made larger than a roughness of an inner ring raceway surface formed on an outer peripheral surface of the inner ring, and

an average roughness R_a of the outer ring raceway surface is

set within $0.1 \mu\text{m} \leq Ra \leq 0.5 \mu\text{m}$ in an axial direction and a circumferential direction, an average roughness of a rolling contact surface of the rolling element is set to $Ra < 0.1 \mu\text{m}$, and an average roughness of the inner ring raceway surface is set to $Ra < 0.15 \mu\text{m}$.

3. A self-aligning roller bearing in which double row rollers as rolling elements are arranged rollably between an inner ring and an outer ring in a circumferential direction,

wherein a roughness of an outer ring raceway surface formed on an inner peripheral surface of the outer ring is made larger than a roughness of an inner ring raceway surface formed on an outer peripheral surface of the inner ring, and

an inequality $Rao/Rai \geq 1.5$ is satisfied where Rai is an upper limit value of a roughness range on the inner ring raceway surface on a center line and Rao is a lower limit value of a roughness range on the inner ring raceway surface on a center line, and a difference of a retained austenite content γ_R between the rolling elements and at least any one of the inner ring and the outer ring is set to 3. % or more in volume ratio.

4. A self-aligning roller bearing according to claim 1, wherein an average roughness of a rolling contact surface of the rolling element is set to $Ra < 0.1 \mu\text{m}$, and an average roughness of the inner ring raceway surface is set to $Ra < 0.15 \mu\text{m}$.

5. A self-aligning roller bearing according to claim 1, wherein an inequality $Rao/Rai \geq 1.5$ is satisfied where Rai is an upper limit value of a roughness range on the inner ring raceway surface on a center line and Rao is a lower limit value of a roughness range on the inner ring raceway surface on a center line, and a difference

of a retained austenite content γ_R between the rolling elements and at least any one of the inner ring and the outer ring is set to 3 % or more in volume ratio.

6. A self-aligning roller bearing according to claim 2, wherein an inequality $R_{ao}/R_{ai} \geq 1.5$ is satisfied where R_{ai} is an upper limit value of a roughness range on the inner ring raceway surface on a center line and R_{ao} is a lower limit value of a roughness range on the inner ring raceway surface on a center line, and a difference of a retained austenite content γ_R between the rolling elements and at least any one of the inner ring and the outer ring is set to 3 % or more in volume ratio.

7. A self-aligning roller bearing according to claim 4, wherein an inequality $R_{ao}/R_{ai} \geq 1.5$ is satisfied where R_{ai} is an upper limit value of a roughness range on the inner ring raceway surface on a center line and R_{ao} is a lower limit value of a roughness range on the inner ring raceway surface on a center line, and a difference of a retained austenite content γ_R between the rolling elements and at least any one of the inner ring and the outer ring is set to 3 % or more in volume ratio.

8. A self-aligning roller bearing according to claim 1, wherein the average roughness R_a of the outer ring raceway surface is set within $0.1 \mu m \leq R_a \leq 0.5 \mu m$ in the axial direction and the circumferential direction in ranges of $b_1/(B/2) \leq 0.9$, $b_2/(B/2) \leq 0.9$ and in a measured length of 0.1 mm to 1.0 mm where B is a width of the outer ring and b_1 , b_2 are a distance from both end surfaces of the outer ring respectively, and the roughness parameter S is set within $0 < S \leq 20 \mu m$.

9. A self-aligning roller bearing according to claim 1,

wherein the outer ring raceway surface has machining traces that intersect with each other and the machining traces are formed by a super finishing.

10. A self-aligning roller bearing according to claim 2, wherein the outer ring raceway surface has machining traces that intersect with each other and the machining traces are formed by a super finishing.

11. A self-aligning roller bearing according to claim 3, wherein the outer ring raceway surface has machining traces that intersect with each other and the machining traces are formed by a super finishing.